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FILING DATE: *March 24, 2003*
RELATED PCT APPLICATION NUMBER: *PCT/US04/09123*

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EU748999846US

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☐ Additional Inventors are being named on the ____ separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)

LASER SYSTEM FOR MEASUREMENTS OF THE PROFILE OF OBJECTS

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 8 ☐ CD(s), Number

☒ Drawing(s) *Number of Sheets* 1 ☐ Other (specify)

☐ Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees

☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number 50-0577

☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($) $80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted, Donald R. Fraser

SIGNATURE _____ Date 03/24/2003

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REGISTRATION NO. (if appropriate) 17,919

Docket Number: 1-36870

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C.

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Frank E. Semersky, Daniel L. Witham, Stephen K. Koskie			Docket No. 1-36870
Serial No.	Filing Date	Examiner	Group Art Unit

Invention:

LASER SYSTEM FOR MEASUREMENTS OF THE PROFILE OF OBJECTS

I hereby certify that the following correspondence:

Provisional Patent Application

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1-36870

TITLE

LASER SYSTEM FOR MEASUREMENTS OF THE PROFILE OF OBJECTS

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to measuring systems and more particularly to a laser system for measuring the profile of an object such as a container, for example.

Description of the Prior Art:

The prior art systems for measuring the profile of an object utilized manually operated micrometers. While such systems achieved the measurement objectives, the systems consumed rather substantial quantities of time and required manual dexterity.

SUMMARY OF THE INVENTION

It is an object of the present invention to produce a system for measuring the profile of an object which is automatic.

Another object of the invention is to produce a system for measuring the profile of an object wherein the object to be measured may be delivered to the system automatically.

Another object of the invention is to produce a system for measuring the profile of an object utilizing a laser micrometer.

Still another object of the invention is to produce a system for measuring the profile of an object and determine the displacement of the top of the object from a given point and the base thereof.

Still another object of the invention is to produce a system for measuring the profile of the threaded finish portion of a container adapted to receive a threaded closure.

The above as well as other object of the invention may be achieved by a system for measuring the profile of an object comprising a source creating a beam of electromagnetic energy; a beam receiver spaced from the source for producing an output signal proportional to the girth of the object being measured; a platform for providing rotational and axial movement of the object to be measured causing the object to intercept the beam produced by the source; and a processor for processing the output signal to form a composite profile of the object being measured.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and advantages of the invention will become manifest to those skilled in the art from reading the following detailed description of an embodiment of

the invention when considered in the light of the accompanying drawings, in which:

Fig. 1 is a schematic front view of a laser measurement system embodying the features of the invention; and

Fig. 2 is a schematic top view of a portion of the system illustrated in Fig. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is illustrated in Figures 1 and 2 a measuring system for measuring the outer profile of an object. It is has been surprisingly determined that the system is particularly useful for providing a quick and simple way of obtaining the profile parameters of PET bottles, filled or empty.

The system illustrated in Figures 1 and 2 include a measuring unit 10 which is a Takikawa Laser Micrometer (Model LDM-305H), purchased through DAS Distribution, Inc. (www.dasdistribution.com). The measuring unit 10 consists of a laser transmitter box and a laser receiver box. The transmitter box sends out a 7" wide laser beam towards the receiver box. When an object is inserted to intercept the beam, the 7" beam is obstructed, reducing it to three components, a smaller beam, a dark area where the object is blocking the beam, and a second smaller beam on the other side of the object. The receiver box then measures the width of the first beam,

the width of the void (and hence the width of the object at that instance), or the width of the second beam.

The object to be measured is supported on a platform 12 which is capable of rotating about a vertical axis. The platform 12 can be indexed upwardly or downwardly. It will be noted that the platform 12 may be in the form of a rotary table which extends outwardly from a vertical motion system 14.

When an object is placed on the rotary platform 12, it can be rotated 360° and moved up and down. The motion system 14 is mounted to the laser of the measuring unit 10 such that the upper bounds on the vertical motion places the platform of the rotary table flush with the plane of the laser, and is considered the zero reference point for the vertical motion.

Software is provided that controls the vertical and rotary motion of the platform 12 and the laser. It is programmed in Microsoft Visual Basic. The software allows the user to raise, lower, and rotate an object through the plane of the beam of electromagnetic energy produced by the laser. At any point the software can poll for the position of the rotary platform 12 (vertical height and rotation) relative to the laser plane and the value that the laser is measuring. By entering minimal initial information, the heights at which to measure, the incremental degrees by which to rotate the object, and the mode in which to scan (see Bulge/Pinch), the user can build an object specific

program in a matter of seconds. By placing the object on the platform 12 and telling the system to start, the measuring unit 10 will scan the object, according the data entered by the user and transmit the data to a file stored in an associated computer 16. To scan a second object, the user simply removes the original object, places the second object on the platform 12 and clicks go. An entire set of objects can be measured and the data for those objects will all be sorted in the same file.

In addition to measuring a bottle at a height and degree entered by the user, the measuring unit 10 can scan a region of the object, search for the maximum (bulge) or minimum (pinch) measurement in that area, and then take measurements around the object at that location.

After the user enters the object information into the computer software, the information can be saved in an object profile. Then the next time it is desired to measure that object the saved profile may be retrieved and be ready to be scanned.

The software has a built-in calibration feature that will calibrate the vertical motion of the system. An object of known height is placed onto the platform and the user enters the height of the object into the software. The system will find the top of the object, move the platform up the height of the object and re-zero the value for the vertical motion.

It will be appreciated that in the illustrated embodiment of the invention, the user has to manually place and remove the objects being measured. An indexing station could be used similar to a carousel on the top of the laser system. In such a system, the user would place up to ten objects in the carousel, click Go, and walk away. After the laser system has measured the first object, that object would be returned to the carousel and the carousel would advance, pushing the first object off the platform and pushing the second object on the platform. This process would continue for all ten objects.

In order to measure the perpendicularity of an object, the object is placed on the platform and centered thereon. The system will then determine the displacement of the top of the object from the center of the table, which is the measure of the perpendicularity of the object.

Also, the threaded portion of the finish of our container can be measured by placing the object on the platform and the software will determine significant dimensional information from the threads. This is different from the typical measurements generated above because the threads are not in the same plane.

From the above description, it will be apparent that the described and illustrated system has produced a quick and simple method and apparatus for measuring he outer profile of an object. The system has been found

to be particularly useful for measuring PET bottles, empty or filled, as well as preforms and associated tooling.

In accordance with the provisions of the patent statutes, the present invention has been described in what is considered to represent its preferred embodiment. However, it should be understood that the invention can be practiced otherwise than as specifically illustrated and described without departing from its spirit or scope.

WHAT IS CLAIMED IS:

1. A system for measuring the profile of an object comprising:

a source creating a beam of electromagnetic energy;

a beam receiver spaced from said source for processing an output signal proportional to the girth of the object being measured;

a platform for providing rotational and axial movement to the object being measured causing the object to intercept the beam produced by said source; and

a processor for processing the output signal from said beam receiver to form a composite profile of the object being measured.

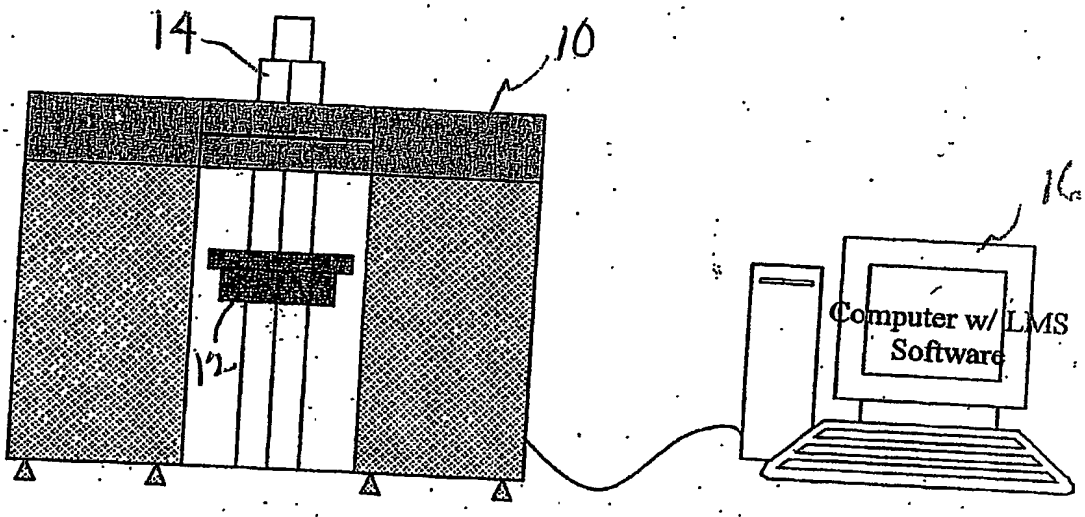

FIG. 1

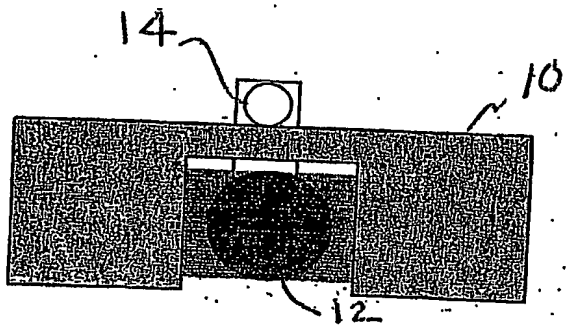

FIG. 2